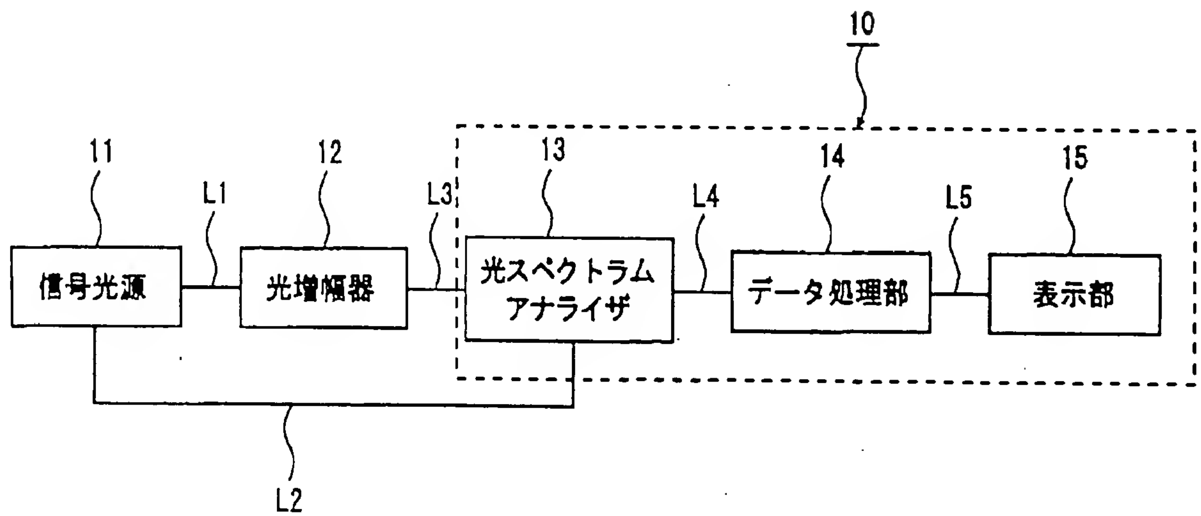
Fig. 1



11 Signal light source
12 Optical amplifier
13 optical spectrum analyzer
14 Data processing portion
15 Displaying portion

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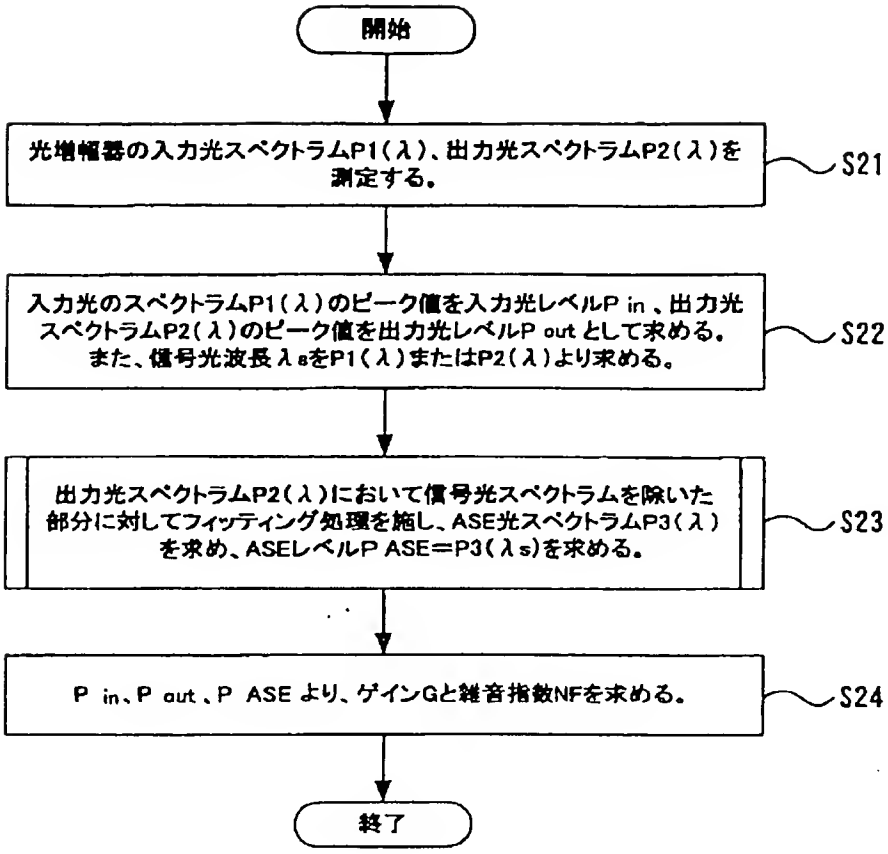
Fig. 2



S21: Measure input light spectrum P1(λ) and output light spectrum P2(λ).

S22: Calculate peak value of input light spectrum P1(λ)as an input light level Pin, and peak value of output light spectrum P2(λ)as an output light level Pout. Calculate signal light wavelength λ_s based on P1(λ) or P2(λ).

S23: Perform fitting process for portion excluding signal light spectrum in terms of output light spectrum P2(λ) data to prepare an ASE spectrum P3(λ) to calculate ASE light level P ASE = P3(λ_s)

S24: Calculate gain G and noise figure NF based on Pin, Pout, and P ASE.

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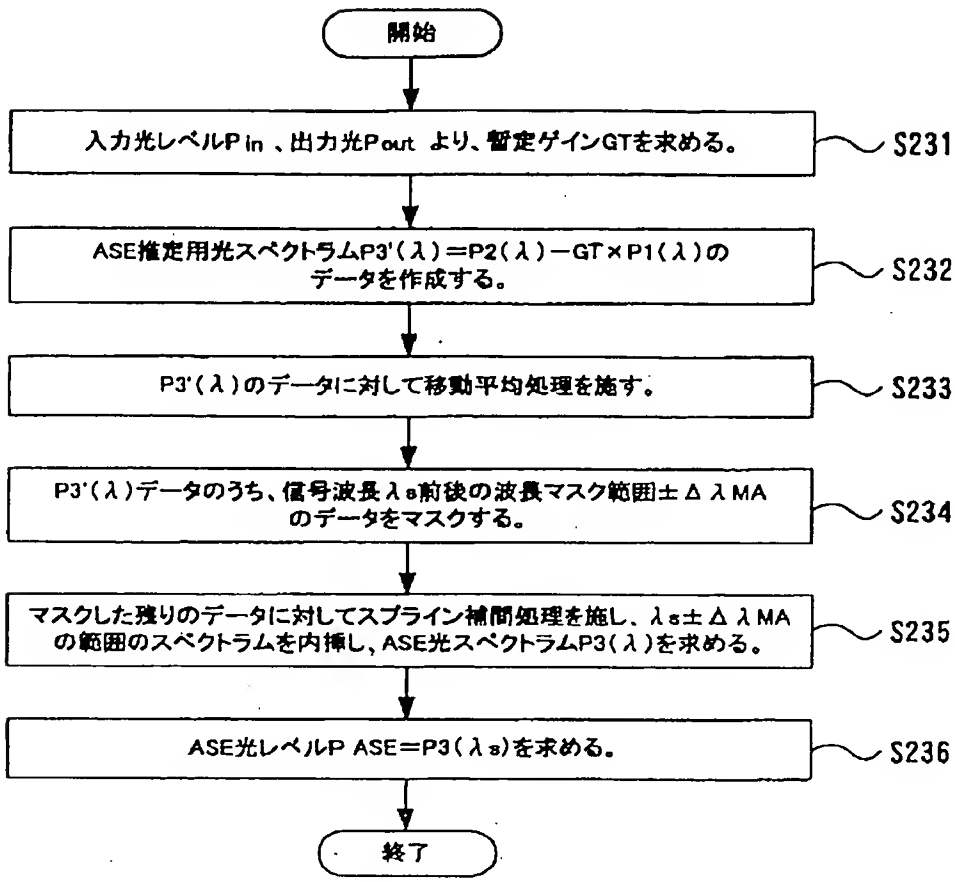
Fig. 3



S231: Calculate provisional gain GT based on input light level Pin and output light level Pout.

S232: Prepare data of light spectrum for assuming ASE $P3'(\lambda) = P2(\lambda) - GT \times P1(\lambda)$.

S233: Perform moving average process for the data of $P3'(\lambda)$.

S234: Mask data within a wavelength mask range of $\pm \Delta\lambda_{MA}$ of $P3'(\lambda)$ data before and after the signal wavelength λ_s

S235: Perform spline interpolation process for the remaining data after masking. Interporate spectrum within range of $\lambda_s \pm \Delta\lambda_{MA}$. Calculate ASE light spectrum $P3(\lambda)$.

S236: Calculate ASE light level $P\ ASE = P3(\lambda_s)$.

Fig. 4A

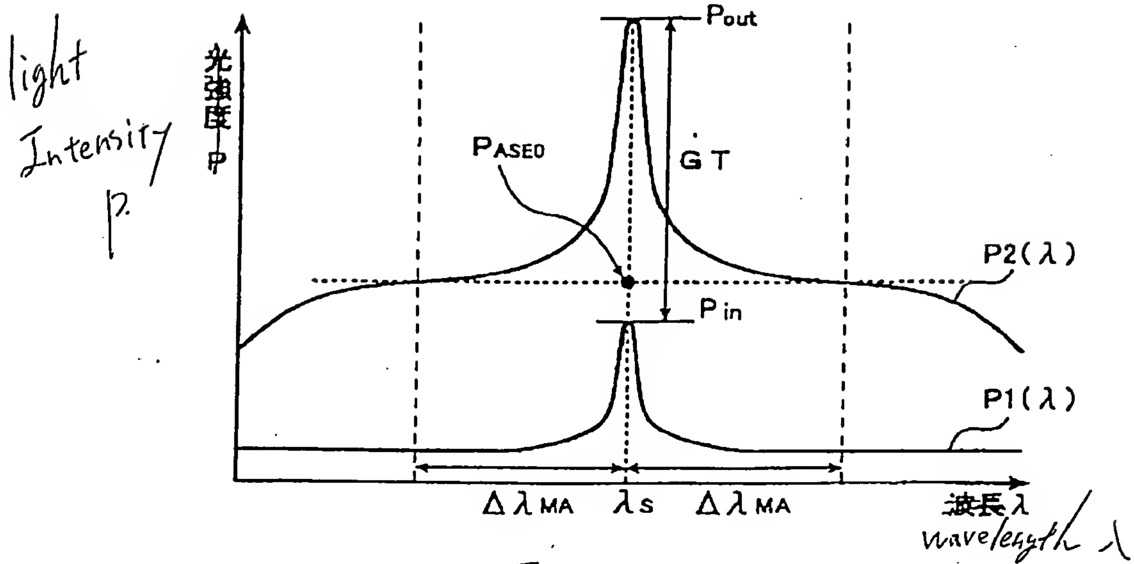


Fig. 4B

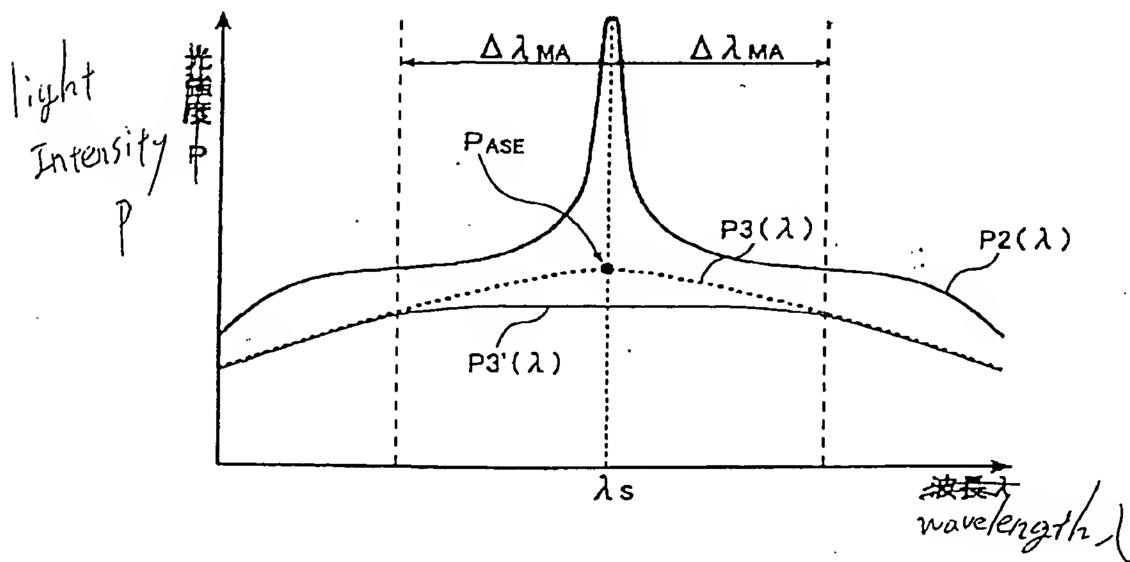
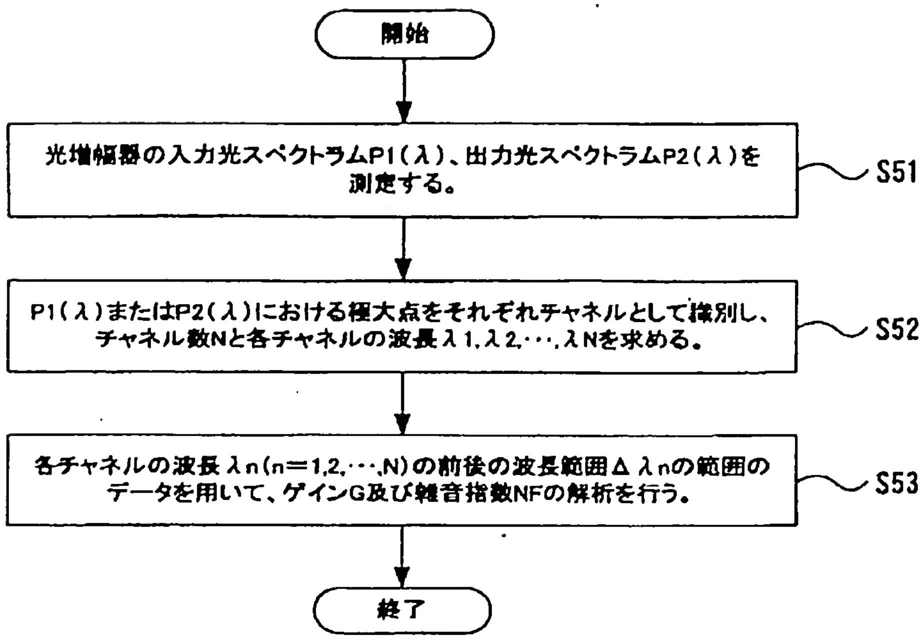


Fig. 5



S51: Measure input light spectrum P1(λ) and output light spectrum P2(λ) of optical amplifier.

S52 Recognize peak points in P1(λ) or P2(λ) as channels, respectively. Determine the number of channels and the wavelengths λ1, λ2, … λN of respective channels.

S53 Analyze gains G and noise figures NF by data within the range of Δλn before and after the wavelength λn (n= 1, 2, … N) of each channel.

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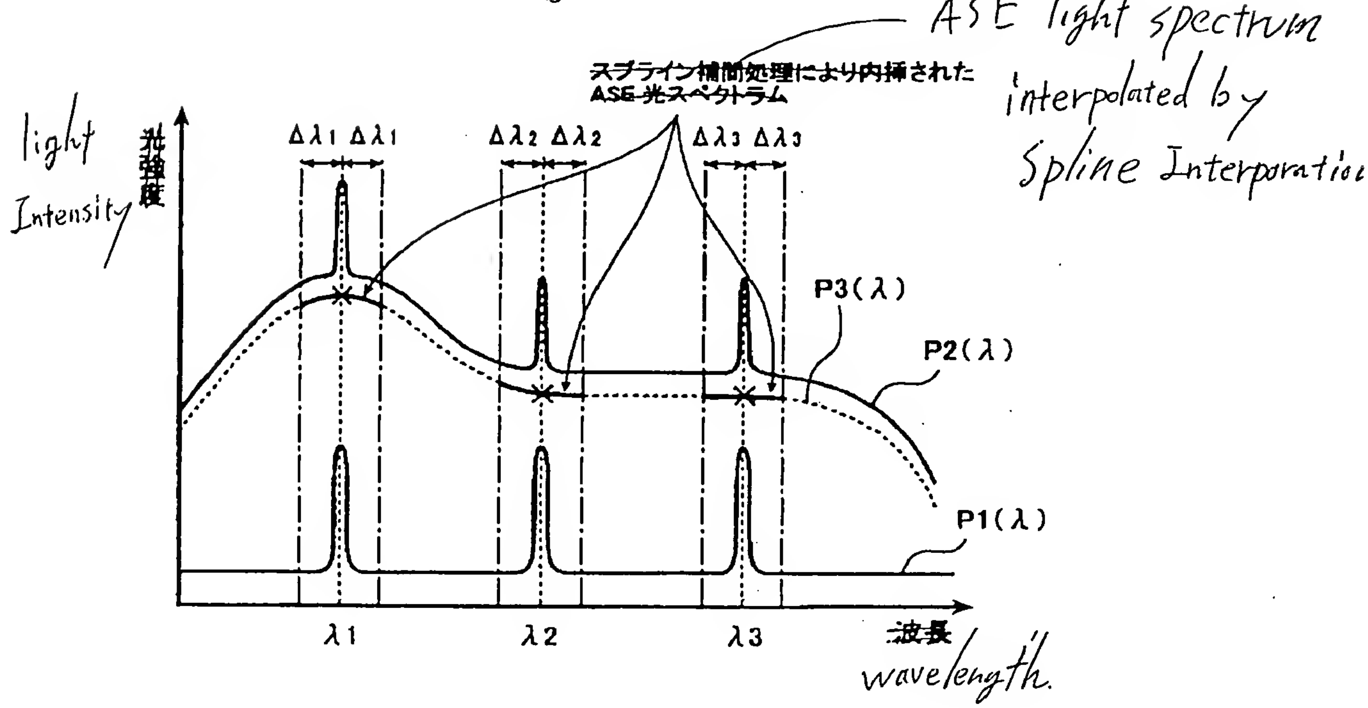
Fig. 6



NOISE FIGURE-MEASURING DEVICE AND NOISE F[illegible]RE-MEASURING METHOD
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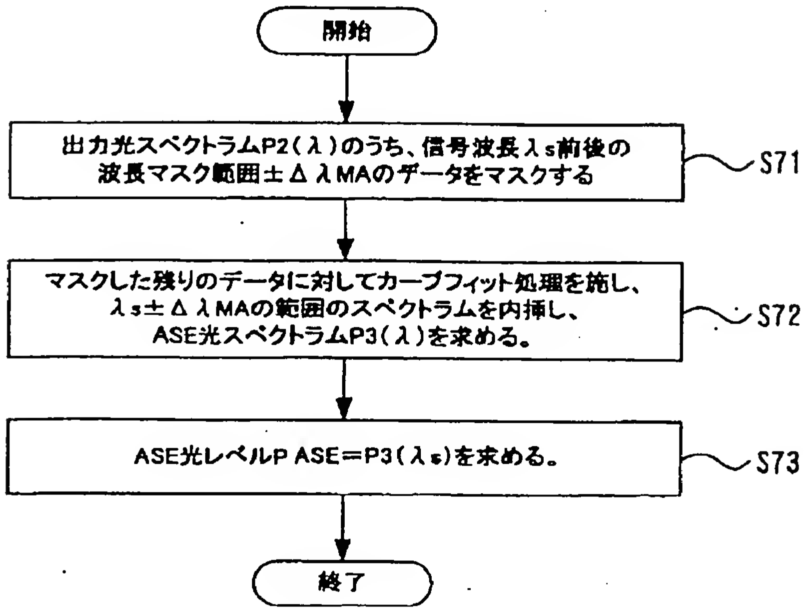
Fig. 7



S71: Of the output light spectrum P2(λ), mask data within wavelength mask range of ± $\Delta\lambda_{MA}$ before and after the signal wavelength λ_s.

S72: Perform curve-fit process for the remaining data after masking. Interpolate a spectrum within the range of $\lambda_s \pm \Delta\lambda_{MA}$ Determine ASE light spectrum P3(λ).

S73 Determine ASE light level P ASE = P3(λ_s).

Fig. 8A

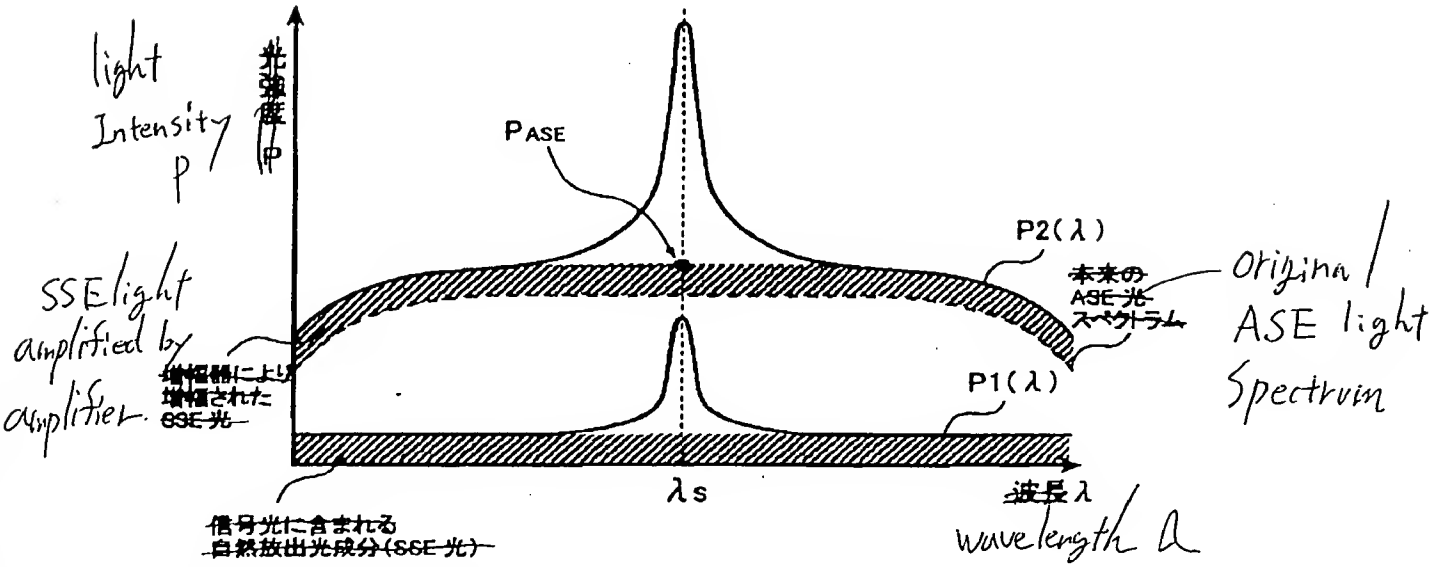


Fig. 8B